

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 53

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ARTHUR DAVIDSON,
TIMOTHY R. DINGER,
WILLIAM J. GALLAGHER,
and
THOMAS K. WORTHINGTON

Appeal No. 1999-2313
Application No. 08/396,288

ON BRIEF

Before HAIRSTON, KRASS, and JERRY SMITH, Administrative
Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. §
134 from the examiner's rejection of claims 45-58, which
constitute all the claims remaining in the application.

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The disclosed invention pertains to a superconductive structure which carries a higher maximum density of supercurrent without transitioning out of a superconducting state. More particularly, the invention uses a high critical temperature (T_c) superconductive copper oxide film having a crystallographic structure with parallel Cu-O crystallographic planes sufficient to create a critical supercurrent anisotropy in the film. The path of flow of supercurrent through the copper oxide superconductive material is determined by the geometry of the superconductive structure and the means for flowing the supercurrent through the superconductive structure.

Representative claim 45 is reproduced as follows:

45. An improved superconductive structure which carries a higher maximum density of supercurrent without transitioning out of a superconducting state, comprising:

a high T_c superconductive copper oxide film for carrying supercurrent within said film in a direction substantially parallel to a major surface thereof, said film having a crystallographic structure with parallel Cu-O crystallographic planes extending therein sufficient to create a critical supercurrent anisotropy in said film, said critical supercurrent anisotropy allowing much more supercurrent to flow along said parallel Cu-O

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crystallographic planes than in a direction perpendicular thereto without causing a transition of said film out of said superconducting state, said film being formed so as to orient said Cu-O crystallographic planes substantially parallel to said major surface; and

means for flowing supercurrent through said film in a direction substantially parallel to said major surface,

whereby the maximum density of supercurrent flowing through said superconducting film in a superconductive state is increased.

The examiner relies on the following references:

Author Unknown, Asahi Shinbun, March 10, 1987, page number and column number unknown (three page, English language translation).

Hidaka et al. (Hidaka), "Anisotropic Properties of Superconducting Single-Crystal $(\text{La}_{1-x}\text{Sr}_x)_2\text{CuO}_4$," 26 Japanese Journal of Applied Physics, No. 4, pp. L377-L379 (April 1987).

Iwazumi et al. (Iwazumi), "Preparation and Property of $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ Single Crystal," 26 Japanese Journal of Applied Physics, No. 4, pp. L386-L387 (April 1987).

Claims 45-58 stand rejected under 35 U.S.C. § 103.

As evidence of obviousness the examiner offers Hidaka or Iwazumi with respect to claims 45, 46 and 50, and adds Asahi with respect to claims 47-49 and 51-58.

Rather than repeat the arguments of appellants or the examiner, we make reference to the brief and the

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answer for the respective details thereof.

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OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the brief along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 45-58. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to

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make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicants to overcome the prima facie case with

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argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1051-52, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered (see 37 CFR § 1.192(a)).

We consider first the rejection of claims 45, 46 and 50 based on the teachings of Hidaka or Iwazumi. The examiner notes that Hidaka and Iwazumi each teaches a superconducting structure which differs from the claimed invention by the specific orientation of the superconductive copper oxide material and the means for flowing current through the film. The examiner finds these differences to be well known in the art, and the examiner asserts that nothing unobvious is seen to have been involved in making the claimed invention (answer,

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pages 3-4).

Appellants argue that the cited references do not describe or suggest the existence of an anisotropy with respect to critical current in high T_c copper oxide superconductors. All the claims require a high T_c superconductive copper oxide material having a critical supercurrent anisotropy. Appellants also argue that there is no teaching or suggestion to use this critical current anisotropy to determine the direction of supercurrent flow through the structure (brief).

The examiner responds that the mere discovery of an existing property of known superconductive copper oxide materials would not be patentable. The examiner finds that appellants' invention would have been expected by one of ordinary skill in the art (answer, pages 5-6).

We agree with the position argued by appellants. All of the claims recite a superconductive copper oxide material having a crystallographic structure with parallel Cu-O crystallographic planes extending therein sufficient to create a critical supercurrent anisotropy in the conductor and the use of this anisotropy to

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determine the direction in which the supercurrent should flow. Even if supercurrent anisotropy of superconductive materials is an inherent property of some materials, the applied prior art does not teach or suggest the relevance of this property or the claimed manner of using this inherent property to increase the maximum density of supercurrent flowing through said superconducting material. Only appellants' disclosure describes how to orient the Cu-O crystallographic planes and the direction in which supercurrent will flow in the material.

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Thus, the claimed invention is not taught or suggested by Hidaka or Iwazumi. Therefore, we do not sustain the examiner's rejection of claims 45, 46 and 50. Since Asahi does not overcome the deficiencies of Hidaka or Iwazumi, we also do not sustain the examiner's rejection of claims 47-49 and 51-58. Accordingly, the decision of the examiner rejecting claims 45-58 is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
ERROL A. KRASS)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
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